# Advanced DVB-S2 Receiver

With

# GigE Interface

## Operational Manual

## Rev 1.9

# Table of Contents

# About this Document

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# 1 About This Document

## 1.1 Target Audience

The target audience for this document is IP over satellite communication professionals.

## 1.2 Purpose and Applicability

This document introduces the setup, configuration, monitoring and troubleshooting of SR1.

## 1.3 Applicable

This document is applicable for the following SW and FW

#### 1.3.1.1 Software – SR1 1.05b232 and above

#### 1.3.1.2 Board version 2.00 and above

#### 1.3.1.3 Boot Loader - 1.01b14 and above

#### 1.3.1.4 Firmware

1. sr1_dt_v2.2b22.afp: General MPE functionality
2. sr1_dt_v2.2b622_prom.afp: MPE in Promiscuous mode
3. sr1_dt_v2.2b822a_mcast_remap.afp: multicast output remap.
4. sr1_dt_v2.2b922a_9_PID.afp: FPGA to add 9th PID for Eumetcast DVB-S

For further details refer to the detailed release notes in Chapter 13.

# ! Note

SW release upgrade may delete the current configuration. Please make sure you retrieve and save configurations form the SR1 prior to upgrade

SW upgrade from 1.05b195 and below to 1.05b232 will erase current FPGA image and require TFTP of new one – It is not possible to upgrade from 1.05b195 and below to 1.05b232 over satellite link where SR1 is the receiver

## 1.4 Technical Support Contact Information

For technical support please contact: Ayecka Communication systems LTD

support@ayecka.com

## 1.5 Eumetcast

For Eumetcast users – please see **SR1 Setup Guide** in Eumetcast website

# SR1 Hardware

# 2 SR1 Hardware

## 2.1 SR1 Hardware Interfaces

The SR1 has the following interfaces:

- Two RF front ends
- GigE interface
- 100BaseT management Interface
- Serial over USB Management Interface.

The SR1 can be operated with a single demodulator or with dual demodulators.

When the second Demodulator is in use, both Demodulators are limited to DVB-S2 8PSK CCM 30Msps. The configuration of demodulator operation mode is supported in the terminal menu and SNMP.

## 2.2 Internal GigE Switch

The SR1 architecture is based on an internal GigE switch. The switch has the following ports:

- Traffic: GigE port
- MGMT: Fast Port
- Internal CPU: RMII connection
- Internal FPGA: RGMII connection
- Application CPU: GigE interface for an optional dedicated applications CPU

The use of the internal switch simplifies installations where the return channel is a Local Wireless Loop or a Satellite TX device.

In network where full isolation of the management and traffic is needed, the SR1 can be set to Isolate mode that disable the internal switching between management and traffic.

## 2.3 Application board

The SR1 supports an option for the Application board. The Application board is a daughter board that can be added to the SR1.

The Application board has a GigE interface to the internal switch.

The application board can be customized according to the application requirement.

For additional information please contact info@ayecka.com.

## 2.4 ASI

The SR1 supports an **option** for single ASI input and ASI output.

For additional information please contact info@ayecka.com..

# Quick Installation Guide

# 3 Quick Installation Guide

Follow the steps described in Table 1 to perform a Quick Installation of the SR1. After any change has been performed, enter **0** as many times required to return to the Main Menu. This will save the changes to the non-volatile RAM (for further details refer to Chapter 5).

If an incorrect value was entered, press **Esc** to ignore the entry.

| Action | Verification | Reference Chapter | Note |
|---|---|---|---|
| Connect the USB Cable | Communication with SR1 | 10 | Install Serial over USB driver and run hyper terminal |
| Modify the management port IP address | | 7.6 | Menu 3.1.<br>Verify DHCP is off |
| Modify the LAN IP address | | 7.6 | Menu 3.A<br>Verify DHCP is off |
| Set the IP address of default gateway | | 7.6 | Menu 3.E |
| Connect the Management Ethernet cable | | 5.8 | |
| Connect the Traffic Ethernet cable | | 5.8 | |
| | Ping to the Management and Traffic interfaces to verify connection | 5.8 | Verify other network elements are properly configured |
| Set RF frequency | | 7.4.1 | Menu 1.1.1.1 |
| Set LNB Power | | 7.4.1 | Menu 1.1.1.F |
| Set 22Khz | | 7.4.1 | Menu 1.1.1.H |
| | Verify RF lock | 7.5 | RF Lock LED |
| Configure the MPE filter (MAC and PID) | | 7.4 | Menu 1.1.1.E |
| | Verify traffic to LAN | | Read statistics and Wireshark |
| | Verify default gateway MAC | 7.6 | Menu 3.G.1 |

**Table 1 - Quick Installation**

# SR 1 – Functionality

# 4 SR1 Functionality

## 4.1 SR1 Integration in Satellite over IP Networks

The SR1 is designed to be integrated into IP over satellite network topologies as described in Figure 1. The Satellite dish (with LNB to receive the signal), and the IP router (which enables the SR1 to forward the IP packets) are common to all the systems. Figure 1 demonstrates a general installation scenario of the SR1.

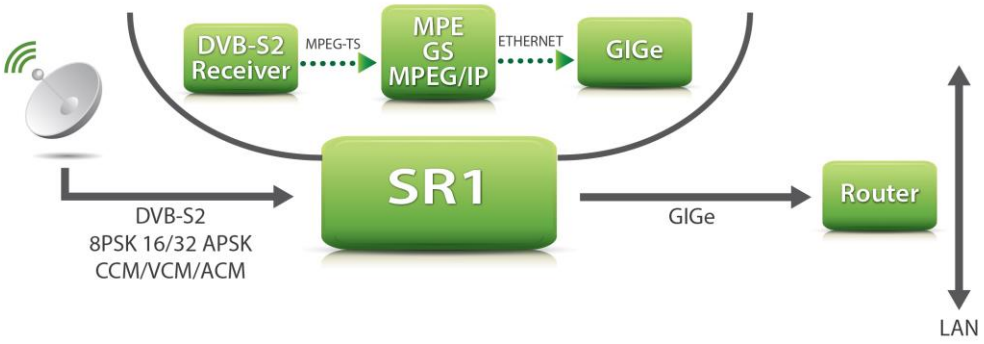


**Figure 1 Typical SR1 Installation**

The SR1 integration process is described as follows:

- The SR1 RF input is connected to the LNB on the satellite dish. SR1 provides the LNB with the appropriate power and control and receives the DVB-S/S2 signal in L-Band.
- The only parameter the operator requires to configure is the RF L-band frequency. The SR1 automatically detects all other parameters.
- For a symbol rate below 1 Msps or for modulations higher then 8PSK, a manual configuration of the symbol rate may be required.
- The automatic channel parameters detection enables the operator to change the MODCOD of the link without the requiring to re-configure the receiver.
- The SR1 supports two RF inputs and can be operated either as single demodulator with two RF inputs or dual demodulators.
- The selection between the two Rx channels and the Rx configuration profiles can be performed manually or automatically.
- All the Unicast IP packets that the SR1 extracts from the satellite signal are forwarded to the router. The SR1 does not support routing functionality what's so ever.
- The IP address of the default router is configured manually. The SR1 uses ARP to find the MAC address of the router.
- The IP address of the default router is not required to be on same subnet as the Traffic interface of the SR1. The Default router must replies to the ARP request of the SR1.
- SR1 supports internal ARP table of 16 entries, making it capable of serving a LAN without a router. When an MPE section has a destination IP address different to the default router, the SR1 will initiate an ARP request to learn the MAC address. If a reply is received the SR1 will keep the match in its internal ARP table. If the table reaches the 17$^{th}$, address, the oldest entry will be overridden.
- In SR1 uses the ARP table IP address and the ARP table IP mask to determine if an incoming packet is in its subnet and implement the ARP mechanism. If the packet is not in the SR1

subnet, it will be forwarded to the default gateway. By default the SR1 ARP table IP address is set to the Default Router IP

- Multicast traffic received is forwarded directly to the Traffic LAN and is blocked from the Management LAN
- The SR1 supports three management interfaces, as follows:
    - 100BaseT interface using Telnet
    - 100BaseT interface using SNMP.
    - Serial over USB interface with a text based terminal application.

Note

Both Traffic and management ports of the SR1 are connected to the internal switch. Connecting both of them to an external switch may cause issues with functionality of both switches

## 4.2 SR1 Block Diagram

The SR1 Block Diagram is illustrated in Figure 2 SR1 Block Diagram

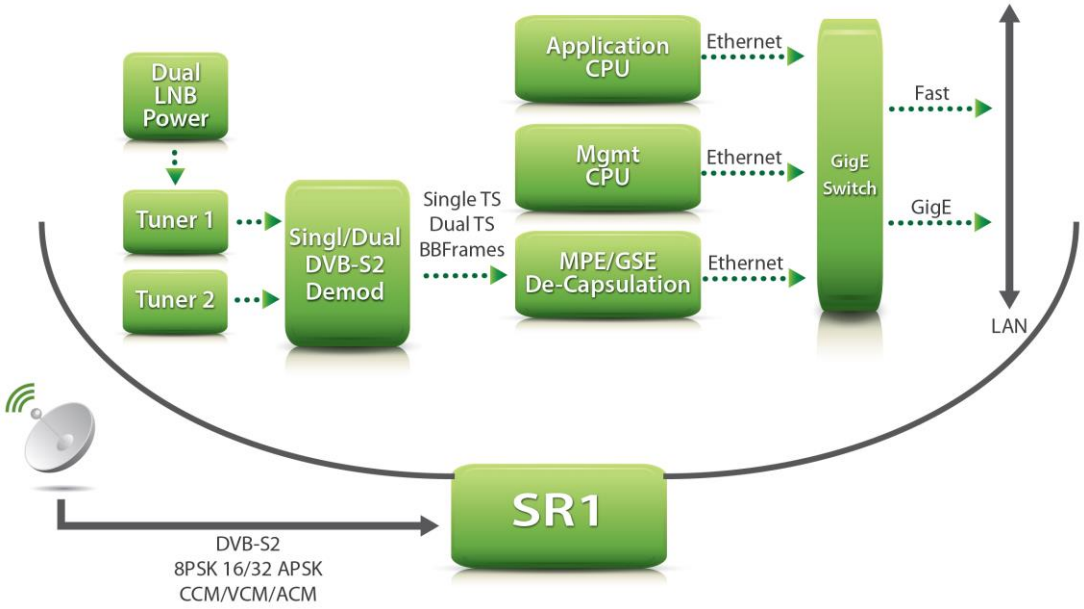


**Figure 2 SR1 Block Diagram**

The SR1 structure includes the following parts:

- **Tuner 1 and 2:** Full L-Band RF front end with LNB powering and control. When SR1 operates with a single demodulator, both tuners are assigned to the demodulator and the tuners act in redundant mode. When using the SR1 in dual demodulator mode each demodulator has a single tuner.
- **DVB-S2 Demodulator:** The demodulator can be configured to a single demodulator (with the support of up to 32APSK 45 MSPS VCM/ACM) or dual demodulator (with support of 8PCK CCM 30Msps).
- **De-Capsulation**: The De-Capsulation block extracts the IP/Ethernet packets from the Transport stream (in MPE mode) or the Base Band Frames (in GSE mode). When SR1 operates with a single demodulator, all 8 De-Capsulation filters are assigned to the single demodulator. When the SR1 operates in dual demodulator mode four filters are assigned to each demodulator.

- **Management CPU:** The management CPU implements the control of the board and the user interface.
- **Application CPU**: The application CPU is an optional CPU (added ad daughter board) that has a GigE connection to the switch.
- **GigE Switch:** The backbone of the SR1 is an internal managed GigE switch. The Internal switch is managed (QoS, VLAN etc).

## 4.3 SR1 Receivers Management

The SR1 receiver consists of three components. The RF inputs, the Demodulator and the De-capsulation filters.

The SR1 supports two modes for operating the receivers ( RX channels):

- **Single Demodulator:** The two RF inputs are connected to a single demodulator. All the eight De-Capsulation filters are connected to the single demodulator
- **Dual Demodulator**: Each RF is in use by one of the demodulators. 4 de capsulation filters are connected to the first demodulator and 4 to the second
- For each receiver, the SR1 supports two configuration profiles. The configuration profile includes the RF parameters (L-Band frequency and LNB control), the demodulator parameters and the de-capsulation filters configuration.
- The operator uses the SR1 in the following modes:
- Single Demodulator with a Round Robin rotation between the Two RF Inputs and between the Two Configuration Profiles of each. RF1 (Profile1) -> RF1 (Profile2) -> RF2 (Profile1) -> RF2 (Profile2) -> RF1 (Profile1):
- The SR1 rotates between the states until it locks on a valid signal.
- The time out for each state is configurable.
- The two RF inputs can be connected to two different LNBs on to different antennas.
- The lock criteria is RF lock and does not validate the data.
- **Single Demodulator with One RF Input and Two Profiles**. The SR1 will switch to the second profile the moment it loses the lock on the first one
- **Dual Demodulator**, each with a Single RF with two profiles.
- **Single RF input** with single profile and single demodulator

## 4.4 SR1 Packets forwarding

The SR1 forwards IP packets received from the satellite link, into the local LAN over the Traffic interface.

When a destination MAC address of an MPE section matches the MAC address in one of the SR1 Filters (after passing the PID stage) the IP part is encapsulated into a Ethernet packet and sent to the internal switch

## 4.5 SR1 with VCM signals

The SR1 support reception of DVB-S VCM. To ensure stable reception in different condition the SR1 dynamically enable/prohibit processing of particular DVB-S2 MODCODs according to current signal to noise ratio. The link margin boundaries are 0 dB and 2.5 dB.

## 4.6 SR1 SNMP MIB

The SR1 SNMP MIB provides the operator an interface to configure the device, monitor it and receive alerts (traps) on specific events. For further details on the MIB refer to Chapter 16, SNMP MIB

For the SNMP MIB of the SR1 please contact info@ayecka.com.

on page 73.

The MIB is comprised of the following sections:

- Configuration of the RX channels including the RF and MPE parts.
- A Network enabling the operator to control IP address acquisition mode (static or DHCP), Read MAC address and more.
- A system enabling the operator to reboot the device, initiate the SW upgrade, perform a FPGA upgrade, read serial numbers and more.
- Traffic counters – The SR1 MIB support traffic counters for two interfaces – FPGA and Management CPU

FPGA

- InOctets – Packets sent to FPGA (ARP, Ping etc)
- OutOctets – Packets sent from FPGA (Packets from Air). These are the packets sent out to the LAN

Management CPU

- InOctets – Packets sent to CPU
- OutOctets – Packets sent from CPU

- Alarms listing all available traps
  - Demod Lock: A trap is sent when Demod lock on signal or loose lock
  - Link Margin Low: When the Link margin is lower than 1db
  - Link Margin High: When the link margin is higher than 3db

# SR1 Installation

# 5 SR1 Installation

**Safety Warning**

**The antenna used with the SR1 must have proper grounding.**

## 5.1 Powering Up the SR1

Ensure the following when powering up the SR1:

- Verify the SR1 is powered with 12C DC.
- Always use power adaptor supplied by Ayecka.
- Plug the power adaptor into the AC power, with caution.

## 5.2 Front Panel

The front panel is the SR1 side that is connected to the different networks, is illustrated below.


**Figure 3 - SR1 Front Panel**

The following table describes the front panel interfaces:

| Interface | Description | Type / Range |
|---|---|---|
| Traffic port | GigE RJ45 connector. | RJ45<br>100/1000 BaseT<br>Auto sense<br>Yellow LED – Gige<br>Green Led - TX |
| Management port | 100BaseT RJ45 connector.<br>Two leds | RJ45<br>10/100 BaseT<br>Auto sense<br>Left LED – Activity<br>Right Led - link |
| Control | Serial over USB for local management. | Mini USB type B |

| Interface | Description | Type / Range |
|---|---|---|
| Power LED | Indication LED, indicating availability of DC power to the SR1 and Firmware programming state. | Red - at the very SR1 startup after the power has been applied. The constant red coloring indicates that SR1 application software has been launched.<br>The LED will stay red until the SR1 starts loading the Firmware, or in case of a fault in Firmware loading.<br>**Red/Green Blinking** - During Firmware programming process, which generally lasts for 5-8 seconds.<br>If the Firmware programming fails, the led will turn red again.<br>Green - The led turns green constantly after two conditions are met:<br>The SR1 application software has been successfully launched<br>AND<br>The Firmware has been successfully programmed. |
| DC in | DC power input to the SR1 | 12VDC, 2A |

**Table 2 - SR1 Front Panel Interfaces**

## 5.3 Back Panel

The SR1 Back panel containing the RF inputs is shown below:


**Figure 4 - SR1 Back Panel**

Table 3 - SR1 Back Panel Interfaces describes the back panel interfaces:

| Interface | Description | Range |
|---|---|---|
| **RF 1** | DVB-S2 receiver RF input of receiver #1 | F type Female Connector.<br>L-Band<br>-35 to -75 dBm |
| **Lock 1** | Status LED of #1 receiver | **RED** : Receiver #1 is not locked<br>**Blinking RED** :Receiver #1 is in lock process<br>Green: Receiver #1 is locked |
| **RF 2** | DVB-S2 receiver RF input of receiver #2 | F type Female Connector.<br>L-Band<br>-35 to -75 dBm |
| **Lock 2** | Status LED of #2 receiver | **RED**: Receiver #2 is not locked<br>**Blinking RED**: Receiver #2 is in lock process<br>**Green**: Receiver #1 is locked |

**Table 3 - SR1 Back Panel Interfaces**

## 5.4

## 5.5 Installation Procedure

## 5.6 Power UP

The power up includes the following:

- Plug the DC into the SR1.
- Verify that the Power LED blinks between the Red and Green for ~15 seconds and then remains Green.

Note: If the LED does not turn green after 15 seconds, refer to Chapter 8 - Trouble Shooting

## 5.7 Configuration

Configure the following parameters:

- **RF frequency:** For further details refer to 7.4.1.
- **MPE Filters**: For further details refer to 8.8.4.
- **Default Gateway IP Address:** For further details refer to 7.6.

## 5.8 Cables Connection

Connect the cables to the SR1 in the following order:

- RF
- LAN
- Management
- Power

**Note:**

Serial management is optional. It should be used for initial configuration only.

# SR1 Configuration and Management

# 6 SR1 Configuration and Management

## 6.1 Serial Interface

The SR1 provides a serial over USB management interface. The Serial over USB is use to interface with the terminal based UI

## 6.2 Telnet Interface

The SR1 provides a Telnet over IP interface. The Telnet is use to interface with the terminal based UI.

Telnet session is taking over the control form the serial interface. To regain control to the serial interface (and drop the telnet session) press ‘x’ on the serial interface.

SR1 is limited to a single Telnet session

# SR1 User Interface

# 7 SR1 User Interface

## 7.1 General

The Terminal Base User Interface is managed by selecting menu items, defining values, and saving the revisions, as follows.

- **Selecting Items** – Press the relevant number or letter.
- **Setting Values** – Enter the relevant value, or select from a list of options. Once the value has been entered or selected, press **Enter**.
- **Toggle** – When there are only two options for setting, selection will toggle between the two.
- **Save to Non Volatile Memory (NV memory or Flash memory):** Press **0** to save the new value to the non-volatile memory of the SR.
- **Time out**: If after 30 from entering to a menu, it is not save to NV memory, a warning message will appear

## 7.2 Powering Up

During power up, or after a cold reset, the Terminal displays the following text (where Programming FPGA need to complete to 100%.):

```
Cortex-M3 bootloader version 1.01b14
Looking for application software...
An image found. Version 0x0105C200
Valid ? Yes
Active ? No
An image found. Version 0x0105C300
Valid ? Yes
Active ? Yes
Loaded ? Yes

A valid application software found loaded to on-chip
flash.
Checking whether upgrade mode entry is requested...No
Launching application software at 0x00005000

Programming FPGA ...
100 percent complete
```

## 7.3 Main Menu

This section describes the main menu, as described below.

**To access the main menu**:

Press **0** (for as many times as required) from any sub menu, to proceed to the main menu.

The main window is displayed:

```
SR1c Serial No. 104652  30AAC                                Run Time:    0:19:14
Software Version  1.05b232   Hardware Version  2.05  Firmware Version  2.02b022

RX1: Active, Locked
 blablabla 1500.000 MHz, DVB-S2 16APSK 5/6, 44.991 Msps, CCM, 43.2 dB

RX2: Not Active, Not Locked
 Profile 1 1100.000 MHz, Auto
================================================================================
1. Configuration
2. Status
3. Network
4. System
5. Statistics
6. ACM Client
```

The main menu includes the following information:

- Run Time is counted since last reset.
- Channel parameters are updated automatically based on received signal.
- Valid Firmware version indicates FPGA programming was completed successfully. If Firmware version indicate 'ERROR' then FPGA image is corrupted. See chapter 11 for more information about FPGA image management
- In SR1 with single receiver, the Rx2 parameters will not be displayed
- 30AAB – Indicates the demodulator type – BAB is for Broadcast and AAC for Advance. 30 for cut 3.0.
- Free text describing each profile that is in use in each Rx
- Lock / unlock indication
- In locked signal – MODCOD, Symbol rate, Type and Es/No in DB

**Note**

The example above refers to SR1 with dual receivers. In case of single receiver, the 2nd line will not appear.

# 7.4 Configuration Menu

The **Configuration Menu** configures the SR1 receivers (RF, Demodulator and De-Capsulation). For a detailed description of the different modes of the receivers, refer to SR1 Receivers Management on paragraph 4.3.

**To access the configuration menu:**

- From the Main menu, select Configuration. The configuration menu is displayed, as follows:

```
Configuration
=============

1. Config RX Channel 1
2. Config RX Channel 2
3. Select Active RX Channel
4. RX Channel Switching          Manual
5. RX Channel Operation Mode     Single
6. RX Data Stream Mode           Packet
7. Number of Transport Filters   8 / 0
```

## 7.4.1 Number of Transport Filters

The Number of transport filters determine how many of the 8 available De-MPE filters will be allocated to Rx1 and to Rx2. In the above example all 8 are allocated to Rx1. 4/4 indicates 4 to each Rx

The split of the Filters pool is relevant only when the SR1 is in Dual demodulator mode. When in Single Demodulator mode all 8 filters are allocated to the active RX

## 7.4.2 RX Data Stream Mode

The Data Stream mode enable configuration of SR1 to work in transport stream mode or Base Band frames mode. Base Band mode is not activated in SW version 1.05XXX

## 7.4.3 RX Channel Operation Mode

The RX Channel Operation Mode determines if the SR1 will work with single demodulator and two RF inputs. Or dual demodulators each with single RF input.

**To define the RX channel operation mode**:

From the **Configuration** menu, select, **5: Rx Channel Operation** mode The **Rx Channel Mode** window is displayed:

```
RX Channel Mode: Single
===============
1. Single Mode
2. Dual Mode
```

Select the required option to define the required mode, as follows:

- **Single Mode**: Select **1** to configure the system in single mode.
- **Dual Mode:** Select **2** to configure the system in dual mode.

**Note**

In Dual mode the two Rx channels work in parallel, where in single mode only one Rx channel is active at single time.

In Dual mode the Maximum symbol rate and MODCOD are limited to 45Msps 8PSK.

### 7.4.4 RX Channel Switching

The RX Channel Switching menu configures if changing RX will be automatic (in round robin fashion) or active RX will not change.

**Note:**

The **RX Channel Switching** menu is disabled when the **Rx Channel operation** mode is configured to **Dual Mode** in the previous section.

**To define the RX channel switching mode**:

- From the Configuration menu, select 4. Rx Channel Switching. The RX Channel Mode window is displayed:

```
RX Channel Switch Configuration Management
==================================
1. RX Channel Switch Mode       Auto
2. RX Channel Switch Period     20 sec
```

- Select the required option as follows:
  - **Rx Channel Switch Mode:** Select this option to define the Rx Channel Switch Mode
  - **Rx Channel Switch Period:** Select this option to define the Rx Channel Switch period.

### 7.4.5 RX Channel Switch Mode

**To define the RX Channel Switch Mode:**

- From the RX Channel Switch Configuration Management, select 1 to configure the RX Channel Switch Mode. The **RX Channel Switch Mode** window is displayed:

```
Configuration RX Channel Switch Mode
====================================
1. Automatic
2. Manual
```

- Select the required option, as follows:
  - **Automatic**: Select **1** to define the channel switching to be in automatic mode
  - **Manual:** Select **2** to define the channel switching to be in manual mode.

### 7.4.6 Configuration RX Channel Switch Period

**To define the RX Channel Switch Period**:

- From the **RX Channel Switch Configuration Management,** select **2** to configure the RX Channel Switch Period. The **RX Channel Switch Period** menu is displayed:

```
Configuration RX Channel Switch Period
====================================
Enter Switch Period in Seconds [20 - 120]:
```

- Enter the required switch period in seconds (Between 20-120). :

### 7.4.7 Select Active RX Channel

Select the Active Channel to allow the operator to manually select the active channel when in **Single Rx Channel** mode.

**To define the Active RX Channel**:

- From the Configuration menu, select, 3. Active Rx Channel. The Select Active Channel menu is displayed:

```
Select Active Channel
=================
1. Rx Channel 1         Active
2. Rx Channel 2         Not Active
```

- Select the required option to define the active channel.

### 7.4.8 RX Channel Configuration Menu

The SR1 support two physical RX channels.

This manual will explain the configuration of RX1. Configuration of Rx2 is similar.

The RX Channel 1 Configuration menu enables configuring the reception, demodulation and De-Capsulation parameters of the Rx channel.

**To define the RX 1 Configuration settings**:

- From the main menu select, **1. Config Rx Channel 1** to define the RX Channel 1 configuration. The **RX 1 Configuration** menu is displayed:

```
RX 1 Configuration
==================
1. Configuration Set 1                  Active
2. Configuration Set 2                  Not Active
3. Configuration Sets Management
```

- Select the required option to define the Rx 1 configuration

### 7.4.8.1 RX Channel Configuration Sets Management

Each RX channel (Physical channel) supports two configuration sets. The selection of configuration set can be manual or automatic.

In **Automatic** mode the SR1 will try to lock using one configuration set for configured period of time. If it fails to lock, it will try the other configuration set.

The display on the main menu is updated according to the configuration set in use.

**To define the RX 1 Configuration Set Management:**

- From the RX 1 Configuration menu, select 3. Configuration Sets Management. The Rx Configuration Set Management menu is displayed:

```
RX Configuration Set Management
===============================
1. Profile Switch Mode          Auto
2. Profile Switch Period        3 sec
```

- Select the required option ,as follows:
  - **Profile Switch Mode:** Select this option to toggle between the profile switch mode **Auto or Manual**
  - **Profile Switch Period:** Select this option to define the profile switch period.

When **Automatic** mode, the SR1 will change profile after the defined Profile Switch period in seconds.

#### *7.4.8.1.1 RX Channel Configuration Sets Management: Profile Switch Period*

To define the RX Channel Configuration Sets Management Profile Switch Period:

- From the **RX Configuration Set Management** menu**,** select **1** to configure the Profile Switch Mode. The **Configuration Profile Switch Period** menu is displayed:

```
RX Configuration Set Management
===============================

Enter Switch Period in Seconds [3 - 30]:
```

- Enter the required period in seconds.

### 7.4.8.2 Active Configuration Set

**To define the active RX 1 Configuration Set 1 setting**:

- From the RX 1 Configuration menu, Select **1 Configuration Set 1**. The **Configuration Set 1** menu appears showing the defined settings:

```
Configuration Set 1
===================
        1. Tuner Frequency              1600.000 MHz
        2. Tuner Acquisition Bandwidth  10.000 MHz
        3. Standard                     DVB-S2
        4. Coding Mode                  CCM
        5. Symbol Rate                  Auto
        6. MODCOD                       Auto
        7. RollOff                      Auto
        8. Pilot                        Auto
        9. Spectral Inversion           Auto
        A. Gold Code                    0
        B. Frame Type                   Normal
        C. Encapsulation                MPEG-TS
        D. ISI                          0
        E. Filters Table
        F. LNB power                    Off
        G. LNB compensation             Off
        H. 22 KHz                       Off
        I. Status                       Active
        J. Profile Name                 100ksps signal
```

**Note**

Low Symbol Rate Configuration:
In order to lock on the signal with a symbol rate of 1 Msps or lower it is required to explicitly configure the symbol rate value and an appropriate acquisition bandwidth via the Configuration menu.
In order to cancel the manual symbol rate configuration and enable the SR1 to auto-detect the symbol rate, the symbol rate value in the Configuration menu should be explicitly annulled. The symbol rates that are higher than 1 Msps can be auto-detected by the SR1.

In Table 4, shown below, describes the parameters. Parameters without the detailed value range are derived automatically by the SR1.

**SR1 Rx Channels Configurable Parameters**

| Item | Parameter | Description | Type | Values range |
|---|---|---|---|---|
| 1 | Tuner Frequency | The receiver L-band frequency<br>Units - Mhz | R/W | 950-2100 Mhz |
| 2 | Tuner Acq. BW | Acquisition range of the Rx channel Tuner.<br>Default is 10Mhz<br>**Note**: Please consult Ayecka before modifying. | R/W | 1Mhz – 15Mhz |
| 3 | Standard | The SR1 display the signal's standard – DVB-S or DVB-S2 | RO | |
| 4 | Coding Mode | The SR1 display the signal's Coding mode – CCM or VCM | RO | |
| 5 | Symbol rate | Symbol rate of received signal. If symbol rate is lower than 1Msps the exact symbol rate need to be configured.<br>If Symbol rate is higher than 1Msps then enter '0' to set the SR1 to Auto detection of symbol rate.<br>Units – symbols per seconds | R/W | 0.4Msps – 45Msps<br>0 = Auto detection |
| 6 | MODCOD | The SR1 display the signal's Modulation and coding (MODCODE) | RO | |
| 7 | Roll Off | The SR1 display the signal's roll off | RO | |
| 8 | Pilot | The SR1 display if Pilot is exist in the received signal | RO | |
| 9 | Spectral Inversion | The SR1 display the signal's spectral inversion | RO | |
| A | Gold Code | Configure DVB-S2 PL scrambling Gold code | R/W | 0 – 262141. Default is 0 |
| B | Frame Type | The SR1 display the frame type of the last processed frame, if it is normal or Short | RO | |
| C | Encapsulation | Display the if encapsulation type is MPE (DVB-Ts) or Generic | RO | |
| D | ISI | Input Stream ID allow selection of single stream when in ACM / VCM mode | R/W | Range is 0 to 255 |
| E | Transport Stream Filtering | Configuration of MPE PID/MAC/IP filters | R/W | See Paragraph 7.4.8.2.1 |
| F | LNB power | Power to the LNB | R/W | Off, 13V, 18V |
| G | LNB Compensation | Additional 1V to the LNB power to compensate for long cables | R/W | On, Off |

| | | | | |
|---|---|---|---|---|
| H | 22KHZ | 22KHZ control to the LNB | R/W | On, Off |
| I | Status | In automatic selection of configuration, this indicates if the configuration is active or not. In manual mode this parameter set the configuration to be active or not | R/W | On, Off |
| J | Profile Name | Free text that will be presented on top menu when the profile is in use | | |

**Table 4 - SR1 Rx channels configurable parameters**

Read Only parameters are detected automatically from signal.

### *7.4.8.2.1 RX Channel Filters Table Menu*

Filters Table configuration menu set the parameters related to the De-Capsulation filters - PID/MAC/IP and Multicast. The Menu has 8 records. Select the relevant record by typing the number.

The filters are common when SR1 in single demodulator mode and separated when in dual demodulator mode.

By Default, all MAC address entries are populated with the AIR MAC of the SR1

```
RX Transport Filter Table
=========================
Slot  PID  Ethernet Address Status    IP Multicast
1     601  CC-F6-7A-04-B7-44  Enabled   Block
2.    501  CC-F6-7A-04-B7-44  Enabled   Pass
3.    401  01-00-5E-01-01-01  Enabled   Pass
4.    0    CC-F6-7A-04-B7-44  Disabled  Block
```

#### 7.4.8.2.1.1 RX Channel Transport Filter Record Configuration Menu

The Rx channel transport stream filters record configuration menu sets parameters of specific filter.

Below is an example of setting filter for unicast traffic on Specific PID, with destination MAC address as specified

```
RX Transport Filter Record #1:
==============================
1. PID                  601
2. Ethernet Address:    CC-F6-7A-04-B7-44
3. Status:              Enabled
4. IP Multicast:        Block
```

- **PID –** in Decimal number
- **Ethernet Address –** 6 bytes in Hex
- **IP Multicast:** Select this option to toggle Multicast enable or disabled for the filter
- **Status:** Select this option to toggle the status of the filter Enabled or Disabled.

The example below describes how to set the filter pass all multicast traffic on a specific PID

**Note:**

When setting the filter for multicast only, the Ethernet address has no meaning. The filter will pass all Multicasts.

| | |
|---|---|
| RX Transport Filter Record #2: | |
| ============================== | |
| 1. PID: | 203 |
| 2. Ethernet Address: | D1-51-4C-9C-90-00 |
| 3. Status: | Active |
| 4. IP Multicast: | Pass |

The example below shows setting the filter to pass only multicast traffic with a destination IP address of 225.1.1.1 on a specific PID. The Multicast address of 225.1.1.1 is translated to the multicast MAC address of 01-00-5E-01-01-01

| | |
|---|---|
| RX Transport Filter Record #3 | |
| ============================== | |
| 1. PID | 401 |
| 2. Ethernet Address | 01-00-5E-01-01-01 |
| 3. Status | Enabled |
| 4. IP Multicast | Pass |

## 7.5 Status Menu

From the **Status** menu, select the required status (channel #1 or #2):

```
Status
======
1. RX Channel 1
2. RX Channel 2
```

Selecting one of the channels displays the relevant status information. The **Status** display is automatically updated every 3 seconds.

The example below shows an example of the UI when receiver #1 is locked:

```
RX Status 1
===========
1. Tuner Status                    Locked
2. Demodulator Status              Locked
3. Transport Status                Locked
4. Demodulator Frequency Offset    -243 KHz
5. Demodulator Es/N0               16.9 dB
6. Signal Input Level              -100.0 dBm
7. Demodulator BER                 0.00 e-7
8. Bad Frame Count                 3
9. Bad Packet Count                3
A. Demodulator Link Margin         7.3 dB
B. Modulation Order and Code Rate  DVB-S2 8PSK 5/6
C. Link Adaptation                 CCM
D. Pilots                          On
E. Frame Type                      Normal
F. Roll Off                        20%
G. FPGA                            Loaded
```

**Clear Counters**

Bad Frames count can be cleared by pressing ‘8’

Bad Packets Count can be cleared by pressing ‘9’

Counters will be cleared at next refresh

The **Status** menu includes the following:

- **Tuner Lock**: RF lock of the tuner on digital signal in the configure frequency
- **Demodulator lock:** Lock on DVB-S / DVB-S2 signal
- **Transport Lock**: Transport stream is received with IP packets on it (valid MPE). The Transport stream will stay unlock until first IP packets will pass through the SR1.
- **Demodulator Es/No:** Provides information about the RF signal quality
- **Signal Input Level**: Provides indication about the RF signal power
- **Demodulation link margin**: Provides information about the margins for a given RF signal and the MODCOD. Link margin calculation is based on measuring the Es/No and comparing it to pre-defined thresholds per MODCOD
- **Demodulation Bad Frame Count**: The number of error Base Band frames in the DVB-S2 demodulator.
- **Demodulation Bad Packet Count**: Number of error Transport stream packets in the DVB-S2 demodulator.
- **FPGA:** Loaded indicates FPGA was loaded successfully

The example below shows an example, of the UI when receiver #1 is not locked:

```
RX Status 1
===========
 RX Status 1
 ===========
 1. Tuner Status                    UNLOCKED
 2. Demodulator Status              UNLOCKED
 3. Transport Status                ?
 4. Demodulator Frequency Offset    ? KHz
 5. Demodulator Es/N0               ? dB
 6. Signal Input Level              ? dBm
 7. Demodulator BER                 ?
 8. Demodulator Link Margin         ? dB
 9. Modulation Order and Code Rate  ?
 A. Link Adaptation                 ?
 B. Pilots                          ?
 C. Frame Type                      ?
 D. Transport CRC Errors            ?
 E. FPGA                            LOADED
```

## 7.6 Network Menu

The **Network** menu configures all the networking related parameters, as follows:

```
Network
=======
1. Management IP Address        10.0.0.2
2. Management IP Mask           255.255.255.0
3. Management Ethernet Address  CC-F6-7A-04-CE-D4
4. Management IP Multicast      OFF
5. Management DSCP              0
6. Management VLAN ID           0
7. Management Default Gateway   10.0.0.1
8. Management DHCP Client       ON
9. Management Port State        ON

A. LAN IP Address               192.168.10.31
B. LAN IP Mask                  255.255.255.0
C. LAN Ethernet Address         CC-F6-7A-04-CE-D3
D. LAN IP Multicast             ON
E. Router IP Address            192.168.10.101
F. LAN DHCP Client              OFF
G. ARP Management

H. Air IP Address               192.168.1.161
I. Air Ethernet Address         CC-F6-7A-04-CE-D2
J. Isolate Networks             Isolated
```

The **Network** menu includes the following:

- **Management Interface:** 100baseT Ethernet interface at the front of the SR1
- **LAN (GigE) interface**: 1000BaseT Ethernet interface at the front of the SR1
- **Default gateway IP address:** IP address of device to which SR1 forward all traffic
- **Management DHCP client**: Determine if Management interface IP address is static or DHCP
- **Management DSCP**: Set the DSCP value in IP traffic generated by the Management interface
- **Management VLAN ID**: Set the VLAN value in Ethernet traffic generated by the Management interface
- **Arp Configuration**: Determines if the SR1 will learn the MAC address of the default router by sending ARP or by manual configuration.

- **Air (satellite) Interface:** IP address of the SR1 CPU for IP packets received from the Satellite link. Packets distained to the CPU air IP address will be delivered ONLY to the CPU and not forwarded to the LAN.
- **Isolate Networks:** Allow connecting or isolating the LAN and Management networks. Isolation is done in the internal switch.

### 7.6.1 ARP Management

The **ARP Management** menu manages the behavior of the Traffic interface ARP learning mechanism.

```
ARP Management
==============
1. ARP Configuration
2. ARP Cache Status
```

### 7.6.2 ARP Configuration

The **ARP Configuration** manages the ARP table of the SR1.

When SR1 has to forward a packet, that is in the subnet define by ARP table IP address and ARP table IP Mask, it searches the destination IP in the ARP table and if found uses the destination MAC form the table. If destination IP is not in the ARP table, the SR1 will generate an ARP request. If ARP request fails, SR1 will use the default router.

```
ARP Configuration
=================
1. ARP Management Mode        Automatic
2. ARP Period                 10 seconds
3. ARP Timeout                5 seconds
4. Arp Table IP Address       172.23.45.23
5. Arp Table IP Mask          255.255.255.0
6. Router Ethernet Address    20-CF-30-C0-A3-BC
```

The **ARP Configuration** menu includes the following:

- **ARP Period** – time interval that SR1 will send ARP request to refresh the MAC address of default router
- **ARP Timeout** – the time the SR1 wait from sending ARP request that was not replied to the next request
- **Arp Table IP Address** – IP address used to calculate if incoming packet is in the subnet of the SR1, for the use of the ARP mechanism
- **Arp Table IP Mask** – IP mask used to calculate if incoming packet is in the subnet of the SR1, for the use of the ARP mechanism
- **Router Ethernet Address** – The MAC address of the default router, as was detected by ARP mechanism

**Note:**

By default ARP Table IP == Routers IP, if the ARP Table IP modified in the MMI, it will take the new value. If it set to 0.0.0.0, the Router's IP will be used again.

### 7.6.3 ARP Cache Table

The **ARP Cache Table** menu lists the internal ARP table of the SR1 Traffic interface.

```
ARP Cache Table
===============

192.168.3.3          20-CF-30-C0-A3-BC       Valid
```

## 7.7 System Menu

The **System** Menu configures all parameters related to SR1 maintenance, as shown below:

```
System
======
1. Warm Reset
2. Cold Reset
3. Restore Factory Defaults and Reset
4. Telnet
5. NTP Server IP Address              0.0.0.0
6. SNMP Trap Server IP Address        0.0.0.0
7. SNMP Read Community                public
8. SNMP Write Community               private
9. Events Configuration
A. Software Upgrade
B. FPGA Image Upgrade
C. Hardware Information
D. Menu Timeout                       3600 seconds
E. Factory Settings
F. Bootloader Upgrade
G. RX Link Margin Thresholds
```

The System menu includes the following:

### 7.7.1 Warm reset

The Warm reset restarts the controller without reloading the FPGA or resetting the internal switch

### 7.7.2 Cold reset

The Cold reset restarts the controller, reloads the FPGA and restarts the internal switch.

### 7.7.3 Restore factory Defaults

The Restore Factory Defaults and Reset configures the SR1 to the values set in production, deleting all configurations performed later.

### 7.7.4 Telnet

All Telnet relates settings including the password and timeout.

#### 7.7.4.1 Username

The User Name menu sets the user name for Telnet.

#### 7.7.4.2 Password

The Password menu sets the user name for Telnet.

#### 7.7.4.3 Timeout

The timeout for Telnet to disconnect in absence of activity.

### 7.7.5 NTP Server IP Address

The NTP Server IP Address menu sets the NTP IP address.

### 7.7.6 SNMP Trap Server IP Address

The SNMP Trap Server IP Address menu sets the SNMP Trap server IP address.

### 7.7.7 SNMP Read Community

The SNMP Read Community menu sets the SNMP Read Community string.

### 7.7.8 SNMP Write Community

The SNMP Write Community menu sets the SNMP Write Community string.

### 7.7.9 Events Configuration menu

The **Events Configuration** menu enables selecting different types of event reports.

```
Events
======
1. System Response Configuration
```

#### 7.7.9.1 System Response Configuration

```
Events Responses
================
1. Console          No
2. SNMP Trap        Yes
```

The **System Response Configuration** menu includes the following:

- **Console:** Determines whether to send system event responses to the console
- **SNMP Trap**: Determine whether to send SNMP traps. Select **No** to disable all traps.

### 7.7.10 FPGA Upgrade Menu

To view the FPGA upgrade menu select **C** from the system.

```
FPGA Upgrade
============
1. TFTP Server IP Address:      10.0.0.85
2. Filename:                    SR1_FPGA.afp
3. Show installed versions
4. Start the upload procedure
```

For further information refer to **Chapter 11: SR1 Software and Firmware Upgrade** procedure

### 7.7.11 Show Installed Versions Menu

Selecting **Show Installed Versions** displays the **FPGA versions** menu which enables viewing the images stored in the SR1 nonvolatile RAM.

```
FPGA Versions:
==============
Index      Version      Image Size     Valid   Active
  1.       6.6b6        245027         Yes     No
  2.       2.2b20       378857         Yes     Yes
```

The SR1 can save two FPGA images in its internal non Volatile Memory.

The Show Installed Versions menu includes the following:

- Version: The version number of the FPGA image
- Image Size: The size of image in Bytes
- Valid: Indicates whether the image is valid and can be used
- Active: Select whether to use the image in the next Cold reboot / Power cycle.

### 7.7.12 Software Upgrade Menu

To view the **Software upgrade** menu select **B** from the system.

```
Software Upgrade
============
1. TFTP Server IP Address      10.0.0.85
2. Filename                    SR1c1.02build82.asw
3. Show installed versions
4. Start the upload procedure
```

For further information refer to Chapter 11 SR1 Software and Firmware Upgrade – about the **Software Upgrade** procedure.

#### 7.7.12.1 Show Installed Versions Menu

The Show the installed version menu, enables viewing the Software images stored in the SR1 non volatile RAM:

```
FPGA Versions:
==============
Index        Version       Image Size     Valid   Active
  1.         6.6b6         245027         Yes     No
  2.         2.2b20        378857         Yes     Yes
```

The SR1 can save two Software images in its internal non Volatile Memory

The Show Inst**alled Versions** menu includes the following:

- **Version:** Version number of the FPGA image
- **Image size**: Size of image in Bytes
- **Valid**: Verify if image is valid and can be used
- **Active**: Select to use the image in the next Cold reboot / Power cycle

**Note**

For further details about the software Upgrade procedure, refer to Chapter 11 SR1 Software and Firmware Upgrade

### 7.7.13 Hardware Information Menu

The SR1 Board Hardware Information menu is displayed, as follows:

```
SR1 Board Hardware Information
==============================
Permanent Storage Device:    Numonyx Serial Flash Memory M25PX16 16 Mbit
RX Chipset Cut/Version:      TV0900 30 BAB
```

### 7.7.14 Display Running Configuration

The complete configuration is displayed on the terminal. It is recommended to save the output of the terminal to local text file.

### 7.7.15 Menu Timeout

Set the time out until the user interface close the current menu and pop one up.

### 7.7.16 Factory Settings

For Ayecka only

### 7.7.17 Bootloader Upgrade

To view the **Bootloader upgrade** menu select **F** from the system.

```
Bootloader Upgrade
==================

1. TFTP Server IP Address      192.168.100.90
2. Filename                    EBLc_v1.1b14.asw
3. Show installed versions
4. Start the download procedure
5. Start the upgrade procedure
```

For further information refer to Chapter 11 SR1 Software and Firmware Upgrade – about the **Software Upgrade** procedure.

### 7.7.18 RX Link Margin Thresholds

To configure the Rx Link margins in VCM mode.

```
RX Link Margin Thresholds
=========================
1. Lower threshold     0.0 dB
2. Upper threshold     0.0 dB
```

Then working in VCM mode the SR1 holds an internal EsNo to MODCOD table (based on the standard).The operator can add thresholds on top of the standard values.

### 7.7.18.1 Statistics

The **Statistics** menu displays a different a counter of each MPE filter. Select **1** to view the filters and select **2** to reset them.

```
Statistics
==========
1. Show RX1 Transport Statistics
2. Show RX2 Transport Statistics
3. Reset RX Transport Statistics
```

## 7.7.19 Show Transport Statistics

The Show Transport Statistics menu displays the transport statistics, as follows:

- **No.**: The number of the filter
- **MPEG:** Total MPEG packets that entered the filter
- **Pass:** Number of MPE sections that were constructed
- **MAC Mismatch**: Number of MPE sections that were constructed ,b ut had DST MAC different then configured In the filter
- **MPE CRC Errors:**. Number of MPE sections with CRC errors

RX1 Transport Statistics

==========

| No. | MPEG | MPE | MAC Mismatch | MPE CRC Errors |
|---|---|---|---|---|
| 1. | 61175 | 8149 | 0 | 2 |
| 2. | 0 | 0 | 0 | 0 |
| 3. | 0 | 0 | 0 | 0 |
| 4. | 0 | 0 | 0 | 0 |

**Note:**

The transport statistics is automatically updated every ~3 sec.

## 7.7.20 Reset Transport Statistics

The reset transport statistics will resent all statistics counters of all filters.

# Trouble Shooting

# 8 Trouble Shooting

## 8.1 General

A working SR1 must provide the following indications:

- **POWER LED Green:** SR1 is powered, SW running and FPGA programmed
- **RF IN LED is Green:** The DVB-S2 receiver is locked on input signal
- **LAN interface LED is blinking**: LAN interface is active and traffic flows through
- **Management LEDs are green**: Management interface is connected

## 8.2 Power LED is Off

Power LED is off. The following possible causes should be verified

- Power plug is not fully plugged
- Unplug and plug again the power plug
- Faulty power supply – replace power supply
- Faulty SR1 – replace SR1

## 8.3 Power LED Constantly RED

When the Power LED is constantly RED, perform the following:

- Power Cycle the SR1.
- Faulty SR1 – replaces SR1

## 8.4 Lock LED is Red

The Lock LED indicates the status of the DVB-S2 receiver. Verify the following:

- Confirm RF frequency settings
- Verify the active Rx channel and the active configuration set
- Check LNB settings
- Verify incoming RF signal

## 8.5 LAN Interface Does Not React to Ping

The LAN interface reply to Ping only from the default gateway.

The SR1 sends an ARP request to the default gateway. In case of 3 consecutive failures to receive the ARP reply, the SR1 will retry to restart the GigE interface.

- Verify the “default gateway“ IP address setting in the network menu.
- Verify the MAC address of the default gateway was updated by the SR1 ARP.
- Verify the LAN cable connection.
- Verify the Firmware version is correct. In the main menu verify the Firmware version does not display an 'ERROR’.

## 8.6 No Data Received by Default gateway

Data to the default gateway needs to be received, De-MPE and forwarded. Failure in any of the phases must be verified:

- RF Unlock
- DE MPE filters setting: Verify the correct PID exists and that filter is active.
- Default gateway: The Default gateway is not configured correctly, or does not reply to ARP..
- Statistics Counters: Verify the statistics counters of the relevant filter progresses.

## 8.7 Management Interface does not react to Telnet, SNMP and Ping

The Management interface may be disabled. Check Network menu

## 8.8 No data is received by an host on the LAN

This is different than the case described in paragraph 8.8, it refers to host other then the default gateway.

Check that the specific host appears In the SR1 Traffic ARP table. See more in 7.6.3

## 8.9 No Multicast traffic from the Traffic interface

Verify in network menu, in the LAN section that multicast is enabled.

## 8.10 No traffic form RF received on LAN

Isolate the path of the traffic using the following

- Traffic counter in the statistics menu
- SNMP MIB-2 Interfaces counters.

The SR1 has two interfaces 1 – RGMII port where the FPGA is connected to the switch. Interface 2 – Fast port where the CPU is connected to the switch.

Interface 1:
InOctets - counter (non-negative value) of 8-bit chunks sent out of switch port connected to FPGA
OutOctets - counter (non-negative value) of 8-bit chunks received by switch port connected to FPGA

Interface 2:
InOctets - counter (non-negative value) of 8-bit chunks sent out of switch port connected to MCU
OutOctets - counter (non-negative value) of 8-bit chunks received by switch port connected to MCU

To monitor traffic from satellite link, read the OutOctets of interface 1

## 8.11 SR1 indicates firmware version “error”

The meaning of “error” on the firmware version is that the SR1 application could not load FPGA file

Check the FPGA versions menu, under FPGA upgrade menu, to verify there are FPGA files loaded to the Flash. If the list is empty, please contact Ayecka support

## 8.12 SR1 indicates serial number 987654321

The meaning is that the SR1 software cannot read the serial number from the on board Flash memory. This may be caused by power fluctuation during cold reset or save of factory defaults.

Contact Ayecka support

## 8.13 TFTP fails when Telnet session is active

TFTP and telnet sessions cannot run concurrently.
You can use Telnet to start the TFTP, disconnect form telnet and reconnect when TFTP server indicates that file transmission is completed.
An alternative is to start the Telnet from SNMP or serial

# SR1 Specifications

# 9 SR1 Specifications

Specifications may vary with different versions of the SR1. For further details, please contact Ayecka.

## 9.1 Receiver DVB-S2 Mode

The Receiver DVB-S2 Mode includes the following specifications:

- **Mbodulation**: QPSK, 8PSK, 16APSK, 32APSK (limited to 8PSK CCM in dual demodulator mode).
- **Channel Rate**: Up to 150 Mbps. Not limited by packet per second rate.
- **Symbol Rates**: 0.1Msps to 45Msps (limited to 30 Msps in dual demodulator mode) (limited to 37Msps in 32APSK).
- **Roll-off Factors**: 0.2, 0.25, and 0.35.
- **Coding**: LDPC and BCH decoder as for DVB-S2 requirements.
- **Code Rates**: ½, 3/5, 2/3, ¾, 4/5, 5/6, 8/9, 9/10.
- **Framing**: DVB-S2 framing.
- **Modes**: Dual receiver in CCM / 8PSK mode only.

## 9.2 Receiver RF

The Receiver RF includes the following specifications:

- **Input Freq**: 950Mhz – 2100Mhz (L-band):
- **Input Signal Level**: -35 to -75 dBm
- **Input Connector**: Type F, 75 Ohms

## 9.3 LNB power and Control

The LNB Power and Control includes the following specifications:

- 14/18V
- 22Khz
- DiSEqC 2.0
- Max current 300ma

## 9.4 TS Processing

The TS Processing includes the following specifications:

- **PID / MAC Filtering**: 4 to 8 PIDS / MAC / IP triplets. Configurable between the two Rx channels
- **MPE**: Implementation of EN 301192. Packet and non-Packet mode
- **Multicast:** Enable **/** Disable per PID

## 9.5 Data Interface

The Data Interface includes the following specifications

- **Speed**: 100/1000 BaseT. Auto speed
- **Packet handling**: L2/3
- **Routing Table**: Default gateway + 16 LAN devices
- **Internal Switch**: GigE managed switch

## 9.6 Environmental Conditions

The Environmental Conditions include the following specifications:

- **Operating Temperature**: 0° to 50° C
- **Storage Temperature**: -25° to +85° C
- **Humidity**: 5% to 95% non-condensing

## 9.7 Physical Characteristics

The Physical Characteristics include the following:

- **Dimensions**:3 cm x 10 cm x 15 cm (HxWxD)
- **Weight**: 0.5 Kg

## 9.8 Operating Power

The mains operating power includes the following:

- **Voltage**: 12V
- **Minimum Current**: 1.5A
- **Connector type** – 2mm. + in internal contact

## 9.9 Management Interface

The Management Interface includes the following:

- Serial over USB
- Telnet
- SNMP: Read, Write and Traps

## 9.10 Control and Monitoring

The Control and Monitoring specifications include the following:

- **Serial port**: Serial over USB with terminal based UI
- **IP**: Telnet with terminal based UI
- **IP**: SNMP

## 9.11 Configuration Parameters

The configuration parameters include the following:

- **DVB-S2 Receiver:** Central frequency
- **PID / MAC filter**: 8 PID/ MAC filters
- **Routing**: – Default gateway IP address
- **Multicast**: Pass block per filter

## 9.12 Monitoring Parameters

The monitoring parameters include the following

- **DVB-S2 receiver**: Signal quality
- **MPE Filters**: Counters
- **GigE Interface**: Counters

## 9.13 Maintenance

The maintenance procedures include the following

- SW field upgrade
- FW field upgrade
- BootLoader

## 9.14 Standard Compliance

The standard compliance is comprised of the following:

- Safety TUV/cTUVus; CE
- EMI/EMC FCC part 15, Class B,EN 55022,
- EN 55024, EN61000,AS/NZS
- CISPR 22

# SR1 Serial over USB Cable

# 10 SR1 Serial over USB Cable

The SR1 provides local configuration and management interface using Serial over USB. The Serial over USB is similar to the serial over RS-232 that was popular in the past. To use the Serial over USB you must install the Virtual Com drivers, on the Client PC.

The Drivers for the Virtual Com are available from the support page:

http://www.ayecka.com/Support.html

**To install the drivers**:

- Select the "VCP Driver Kit".
- Download the drivers and follow the installation instructions.

**Note:**

Connect the SR1 Mini USB cable **ONLY** after completion of the drivers installation

- After the drivers are installed and the SR1 is connected, the Virtual Com will be added to the devices on the client PC.
- Use the Device Manager to verify the installation and to obtain the Virtual port number. , below shown an example where the Virtual COM port is COM3.

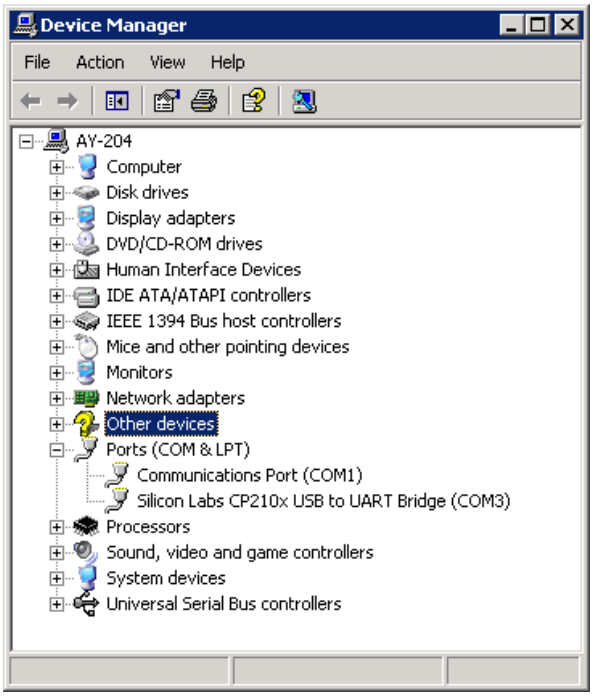


Figure 5 - Virtual COM

- Once the virtual COM is installed properly, any terminal application can be used to manage and monitor the SR1.

- Figure 6, below demonstrates how to use Windows® HyperTerminal:

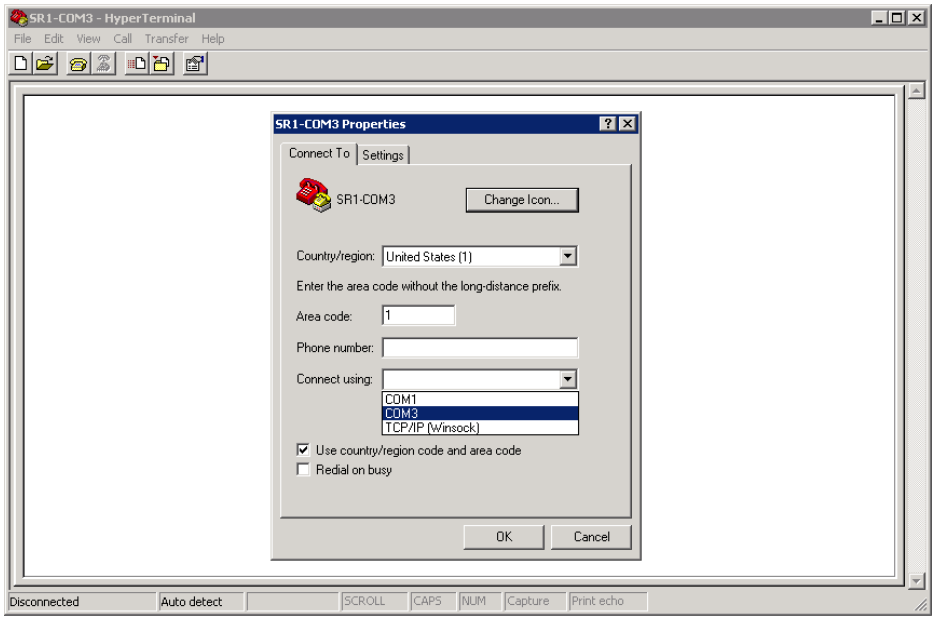


**Figure 6 - SR1 Terminal COM Port Selection**

- After the COM Port is selected, set the COM properties 115200,8,N,1
- Figure 7 below, demonstrate the COM properties settings

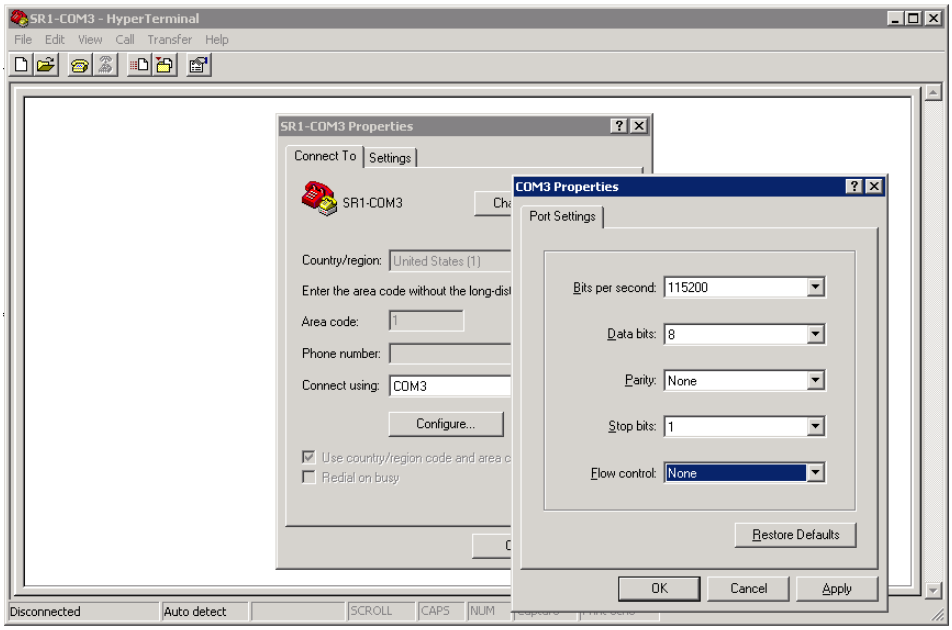


**Figure 7 - SR1 Terminal COM properties setting**

- After the HyperTerminal is configured, enter **0** to initiate communication with the SR1. Figure 8 displays how the terminal should look if all was set correctly.

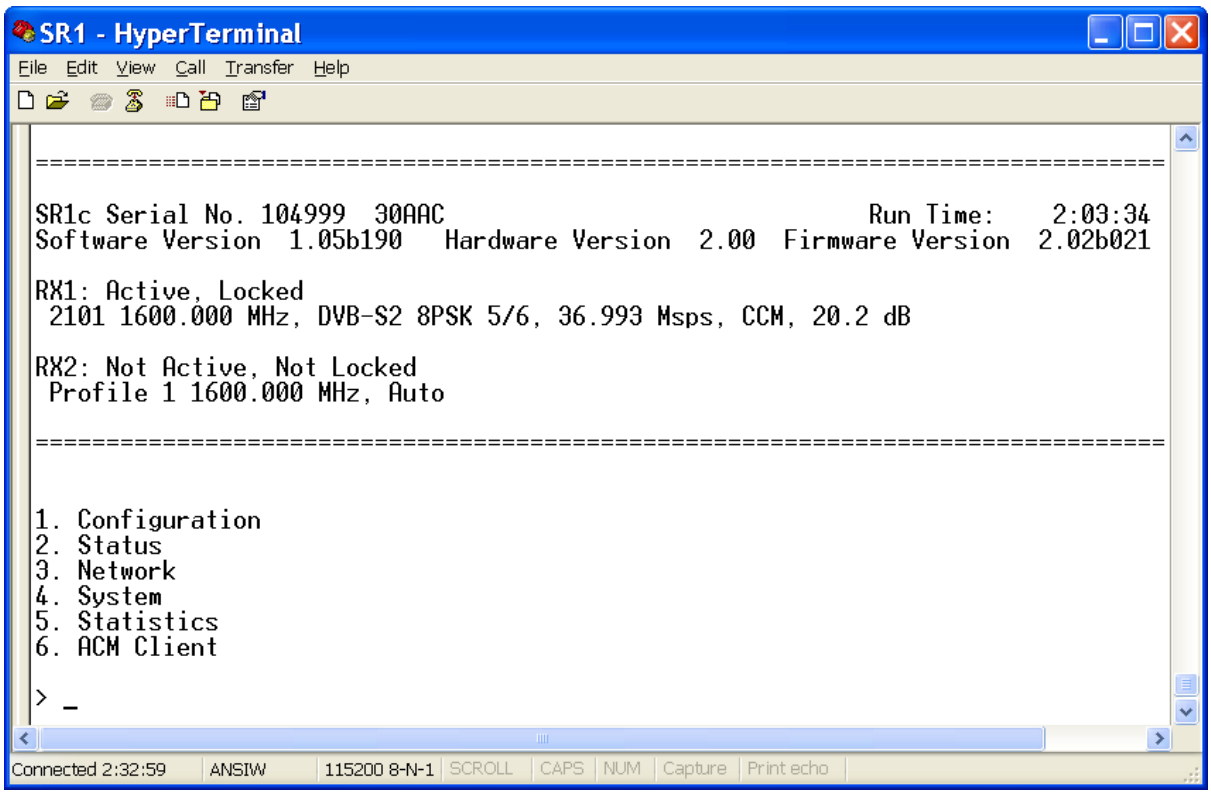


**Figure 8 - SR1 User interface**

**Note**

For further information about the user interface, refer to Chapter 7.

# SR1 Software and Firmware Upgrade

# 11 SR1 Software and Firmware Upgrade

The SR1 internal Flash (non volatile) memory stores 2 images of software, 2 images of firmware and an image of the Boot Loader.

The images can be managed to provide field upgrade of the SR1.

For each type of image (Software or FPGA) there is an active image and non active. The active image is the one to be used in next cold reboot or power cycle.

Images are uploaded using TFTP protocol. When loading a new image it is replacing the non active image.

Specific hardware versions of the SR1 support only Firmeware version management.

**Note:**

! The SW release upgrade may delete the current configuration. Please make sure you retrieve and save configurations form the SR1 prior to upgrade

When upgrading to new Bootloader the recommended order is as follows:

- Upgrade the application and reboot the SR1 with the new Application
- Upload new BootLoader, Activate it and reboot with new Boot loader
- Upload FPGA file and Application

! Telnet and TFTP share same resources, it is recommanded that during the TFTP seassion, Telnet will be disconnected.

## 11.1 FPGA Image Management

At boot, either after a power cycle or cold reset, the SR1 loads the firmware image to the FPGA. This process takes less than 5 seconds. The SR1 stores two images of the Firmware, where one is set to be active and used to configure the FPGA at the boot or restart. The file type for Firmware upgrade using TFTP is **XXX.afp**

**Note:**

The functionality of the SR1 is not interrupted during the FPGA image TFTP process

**To load a new image using the Trivial File Transfer Protocol (TFTP)**:

- Select the FPGA upgrade menu from the system menu.
- Define the following:
  - IP address of the TFTP server
  - Filename of the image to load,
- Select 0 to save the parameters to the NV RAM.
- From the FPGA upgrade menu select the **Start the upload procedure** option to begin the download process.

The example below shows the setting of FPGA image download menu:

**SR1 Software and Firmware Upgrade**

FPGA Upgrade
==========

1. TFTP Server IP Address 10.11.0.1
2. Filename fpga_v2.1b4.afp
3. Show installed versions
4. Start the upload procedure

**To start the upload procedure**:

1. Select 4.Start the upload procedure, the SR1 requests confirmation, as follows: FPGA Upgrade - Are you sure (Y/N)?
2. Click **Y**. The SR1 formats the storage area, and the following is displayed. **Formatting Permanent Storage...**

   The TFTP process will then be initiated.
3. After completion of the TFTP process, select 3. Show installed versions to view the new file. The following is displayed:

```
FPGA Versions:
==============

Index    Version      Image Size    Valid   Active
  1.      2.2b10       380116       Yes     Yes
  2.      4.1b2        248096       Yes     No
```

**Note**

TFTP FPGA file does not load the file to the FPGA, it only load it to the memory on board.

**To select the active FPGA image for the next boot:**

- Select the required version. The following is displayed:

```
Version: 2.2b10, Size: 380116, Valid: Yes Active: Yes
==============================================
1. Active
2. Not Active
```

- Select 1. Active to activate the version. The active FPGA image will be loaded to the FPGA only at the next cold reboot or power cycle.

**Note:**

- In Ayecka ftpd32 - (http://tftpd32.jounin.net/) is used.
- The SR1 TFTP client complies with TFTP (Revision 2) defined by IETF RFC 1350.
- The image file is provided by Ayecka.
- The upload process can take up to 20 sec.

## SR1 Software and Firmware Upgrade

Figure 9 shows a screen dump of the PC running the TFTP server and terminal, during the Firmware upload process.

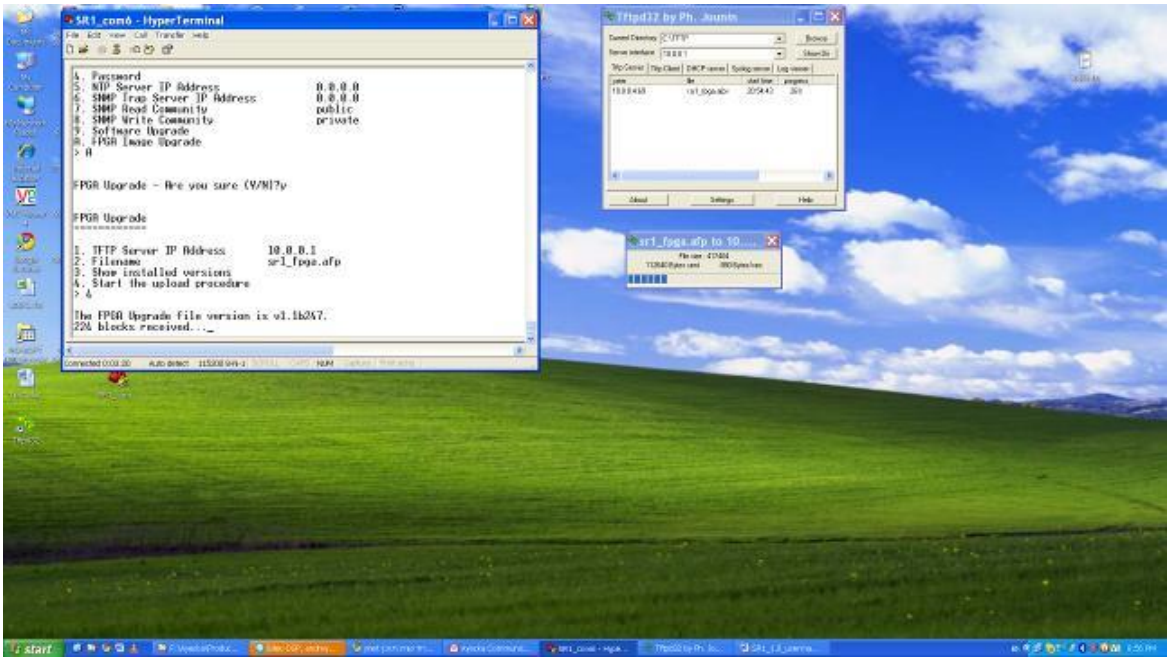


**Figure 9 - Firmware Upload Screen Dump**

After completing the FPGA file upload, select the active version to be used after next reboot. For more information see paragraph 7.7.11.

# 11.2 Software Image Management

The SR1 software contains two software components.

- **Boot loader**: Small and robust code that starts after power up or reset and launch the application. For more information about Boot Loader update see paragraph 11.3 below
- **Application**: Stored in the Flash memory and is field upgradeable.

At boot time the SR1 boot loader verifies whether a new software image was selected as active and performs the following:

- If a new image is selected, the boot loader copies the image from the on board flash memory, to the CPU flash memory.
- If no new image was selected, the boot loader uses the image already stored in the CPU flash memory.
- If a new image fails to run properly on the CPU, the boot loader automatically replaces it with a previous running image.

## 11.2.1 Software Image Upgrade using TFTP

**Note:**

Before performing the procedure described below, please contact support@ayecka.com.

**Note:**

Before upgrading software – make sure to write down all configuration of the device

Before performing the procedure described below,

A software image upload by TFTP is very similar to the process of uploading an FPGA file using TFTP. Refer to paragraph 0 for further details:

- After uploading a new software image using TFTP it is required to be activated in order to be loaded after the next Reboot or power cycle.
- When the SR1 reboots and detects a new image on the Flash memory, it copies it to the CPU internal Flash memory (indicating the copy of each sector with **a dot** on the display):

```
Cortex-M3 bootloader version 1.01b14
Looking for application software...
A valid application software found loaded to on-chip flash.
Checking whether upgrade mode entry is requested...No
Launching application software at 0x00005000.


Programming FPGA ...
100 percent complete
```

**Note:**

The file type for the SW application upgrade using TFTP is **XXX.asw.**

### 11.2.2 Software Images Upgrade with Flash Magic

! Do not use this procedure unless instructed explicitly by Ayecka Support

The file type for SW application upgrade using Flash Magic is **XXX.hex.**

**To define the required settings:**

After installing the Flash Magic software select the following settings:

- Device – LPC2368 Ethernet
- Interface – select the NIC of the computer that is connected to the Sr1 Management interface.
- IP Address – 10.0.0.4
- MAC Address – CC-F6-7A-Ff-Ff-FE
- Erase blocks used by Hex File – checked
- Verify after programming - checked

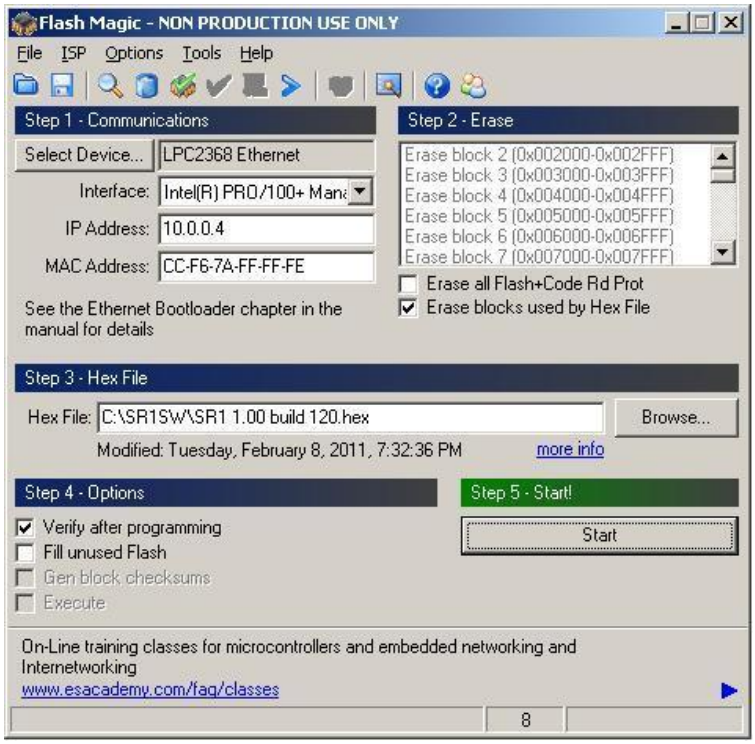


**Figure 10 - FlashMagic screen dump**

Use the **Browse** button to select the **.hex** file to load to the SR.1.

**Note**

Only One SR1 can be upgraded in given time

**To upgrade the software:**

1. Run continues ping (ping a.b.c.d –t) to the management interface of the SR1 you plan to upgrade. Verify you received replies.
2. Telnet to the device and enter the SW upgrade mode (System, Software upgrade).
3. Once you have acknowledged the upgrade you will lose the Telnet connectivity.
4. Once the ping stops replying, press the **Start** button of the Flash Magic.
5. The Flash Magic will communicate with the SR1 and load the new software
6. During the programming process the progress indications are shown in the lower part of the Flash Magic GUI.
7. The SW upload process takes a period of approx. **~20** seconds.
8. After 1 minute from initiating the upgrade process, the SR1 will reboot and after **1.5** minutes review the replies for ping to the Management interface.

**Note**

The SR1 configuration is **NOT** maintained during the software upgrade between major versions.

## 11.3 BootLoader Image Management

The SR1 support field upgrade of the BootLoader. The upgrade process is diveided to two steps – Upload image with TFTP and activating it

**Note:**

The functionality of the SR1 is not interrupted during the BootLoader image TFTP process

**To load a new image using the Trivial File Transfer Protocol (TFTP)**:

- Select the BootLoader upgrade menu from the system menu.
- Define the following:
  - IP address of the TFTP server
  - Filename of the image to load,
- Select 0 to save the parameters to the NV RAM.
- From the Bootloader upgrade menu select the **Start the upload procedure** option to begin the download process.

The example below shows the setting of Bootloader image download menu:

```
Bootloader Upgrade
==================

1. TFTP Server IP Address      192.168.100.90
2. Filename                    EBLc_v1.1b14.asw
3. Show installed versions
4. Start the download procedure
5. Start the upgrade procedure
```

**To start the upload procedure**:

4. Select 4.Start the upload procedure, the SR1 requests confirmation, as follows: Bootloader Upgrade - Are you sure (Y/N)?

5. Click **Y**. The SR1 formats the storage area, and the following is displayed. **Formatting Permanent Storage...**

   The TFTP process will then be initiated.

6. After completion of the TFTP process, select 3. Show installed versions to view the new file. The following is displayed:

```
Bootloader Versions
==================

Index        Version       Image Size     Valid   Active
  1.         1.1b14        15388          Yes     Yes
```

**Note**

TFTP BootLoader file does not in use, it only load it to the memory on board.

**To select the active BootLoader image for the next boot:**

- Select the required version. The following is displayed:

```
Version: 2.2b10, Size: 380116, Valid: Yes Active: Yes
==========================================
1. Active
2. Not Active
```

- Select 1. Active to activate the version.

Once the Bootloader is loaded and selected – start the upgrade process by selecting 5. Start the upgrade procedure.

The new BootLoader will be used at next reboot

**Note:**

- In Ayecka ftpd32 - (http://tftpd32.jounin.net/) is used.
- The SR1 TFTP client complies with TFTP (Revision 2) defined by IETF RFC 1350.
- The image file is provided by Ayecka.
- The upload process can take up to 20 sec.
- During Upgrade process of software or BootLoader, the FPGA image may be erased

# Safety

# 12 Safety

The following safety procedures are exist:

- The SR1 operates from 12V DC with an external power supply.
- The SR1 has been shown to comply with the EN 60950 Safety of Information
- Technology Equipment (Including Electrical Business Machines)

**To avoid chance for risk please follow the instructions below**:

- Install the SR1 indoor.
- Verify the cable are connected firmly
- Always use ONLY power supply provided by Ayecka

# Release Notes

# 13 Release Notes

## 13.1 SW Release Notes for SW Version 1.05b232 / FPGA version 2.02b022 and UP, BootLoader 1.01b14

From 1.05b195 / FPGA version 2.02b021

| Feature / known issue | Note | Release # |
|---|---|---|
| Support VCM in different EsNo | dynamically enable/prohibit processing of particular DVB-S2 MODCODs according to current signal to noise ratio | 1.05b232 |
| System Services | SR1 support System Services in the MIB. Indicating 1 service | 1.05b232 |
| Status counters reset | Added ability to reset (nullify) counters of bad frames and packets from RX Status menu | 1.05b232 |

## 13.2 Open Known Issues

| Issue | Note / Workaround | Release # |
|---|---|---|
| NTP not supported | Non | |
| TFTP and telnet sessions cannot run concurrently. | • Close Telnet during TFTP<br>• Use SNMP to start TFTP download | |
| Stream Mode not supported | Work in MPE CCM mode<br>For GSE/VCM please contact Ayecka | |
| Telnet session has to be fully close | If Telnet session was open by connect command and is terminated from Serial. The session stay open until disconnected from Telnet | |
| Ping to management port from TFTP server is required prior to TFTP | Perform ping to validate connectivity to Management port and allow CPU to learn MAC address of TFTP server | |
| DiSEqC support | Please contact Ayecka | |
| ARP table over SNMP | ARP table can to be read over SNMP<br>Please contact Ayecka | |

# SR1- Integration with Other Technologies

# 14 SR1 Integration with Other Technologies

The SR1 can be integrated with other communication channels to offers enhanced network performance.

**Figure 11** illustrates the integration of SR1 with a VSAT terminal, as follows:

- The Forward link capabilities of the SR1 are superior to VSAT terminals.
- Using the SR1 as a receiver for the forward link enables reception of high bit rate and frame rate traffic.
- IP data from the LAN is passing to the VSAT via the internal switch in the SR1.

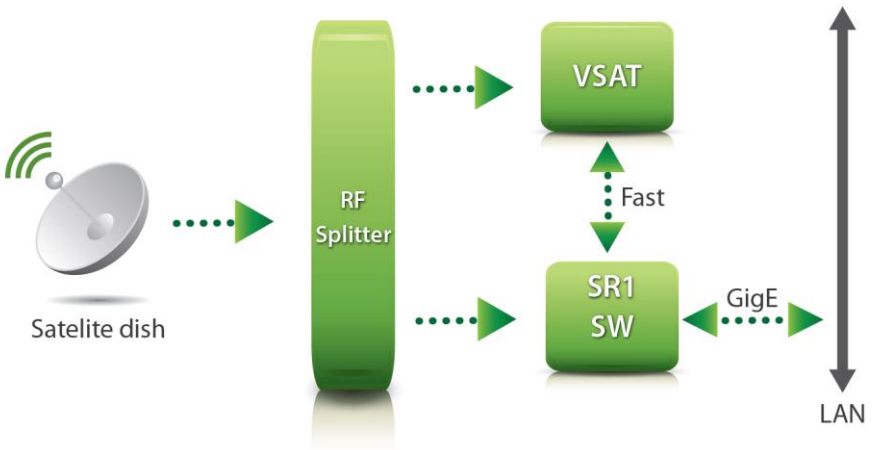


**Figure 11 - SR1 / VSAT integration**

Another optional integration is with Local loop radio. In a Terrestrial networks such as MVDDS or MDS the SR1 can be combined with Local loop radio like WiMax and with residential gateway.

Using the internal switch of the SR1 enables this integration simple and cost effective.

The Local loop link provides the two way connectivity where the SR1 provides the high throughput in the forward link.

# SNMP MIB

# 15 SNMP MIB

For the SNMP MIB of the SR1 please contact info@ayecka.com.